CLAIM AMENDMENTS

1. (currently amended) A fiber optic gyroscope ~~in which~~ comprising:

a light source;

an optical fiber;

an optical fiber coupler;

a substrate-based optical integrated circuit;

a single mode fiber optic coil; and

a light receiver;

wherein a light beam from ~~a~~ the light source ~~is sequentially passed~~ passes through ~~an~~ the optical fiber and ~~an~~ the optical fiber coupler to ~~be incident on a~~ the substrate-based optical integrated circuit ~~having the function to serve~~;

wherein the optical integraged circuit serves as a polarizer and ~~having~~ a branching optical waveguide~~;~~ for branching the light beam into into two beams ~~which are branched by the optical integrated circuit are made to be~~ that are incident on ~~the~~ opposite ends of ~~a~~ the single mode fiber optic coil;

wherein the two beams pass through the single mode fiber optic coil as a clockwise rotating beam and a counter-clockwise rotating beam~~; the clockwise rotating beam and the counter-clockwise rotating beam which have propagated through the fiber optic coil~~ and are coupled together in the optical integrated circuit to produce an interference ~~therebetween~~ beam;

wherein the interference beam ~~is introduced from~~ passes through the optical fiber coupler to ~~a~~ the light receiver ~~in order to convert the light~~; and

wherein the light receiver converts intensity of the interference beam into an electrical signal~~; and the electrical signal is used to detect~~ for detecting an angular rate applied to the fiber optic coil about the axis thereof;

the fiber optic gyroscope further comprising:

a first polarization maintaining optical fiber connected between the optical fiber coupler and the optical waveguide of the optical integrated circuit ~~and having an~~ such that light passing from the first polarization maintaining fiber is directly incident on the optical integrated circuit, wherein the first polarization maintaining optical fiber has a polarization axis coincident with the direction of the TE mode in the optical waveguide, the first optical fiber having a length L1;

a second and a third polarization maintaining optical fiber connected to ~~remaining two~~ end faces of the optical waveguide of the optical integrated circuit ~~at respective one end, respectively~~, where the polarization ~~axis is~~ axes of the second and third polarization maintaining optical fiber are coincident with the direction of the TE mode in the optical waveguide, the second and the third optical fiber having a length of L2 and L4, respectively;

and a fourth and a fifth polarization maintaining optical fiber having one end connected to ~~the other end of~~ the second and the third polarization maintaining optical fiber, respectively, ~~at respective one end where the~~ where relative polarization ~~axis of the~~ axes of connected optical fibers are displaced by an angle of 45°, ~~the other ends of~~ the fourth and the fifth optical fiber ~~being~~ having another end connected to the opposite ends of the fiber optic coil, the fourth and the fifth optical fiber having a respective length of L3 and L5;

~~the optical fibers disposed between the light source and the optical integrated circuit except for the first polarization maintaining optical fiber being all constructed with single mode optical fibers;~~

~~denoting the~~ wherein L denotes a length ~~which is~~ required to produce a group delay time difference between orthogonal polarizations ~~of~~ in each of the polarization maintaining optical fibers which is in excess of the coherence length of a light beam from the light source ~~by L~~, the fiber lengths ~~satisfying~~ satisfy the following ~~requirements~~:

$$L1 \geq L,\quad L3 \geq L,\quad L5 \geq L$$

$$|(L1+L2)-L3| \geq L,\quad |(L1+L4)-L5| \geq L$$

$$||(L1+L2)-L3| - |(L1+L4)-L5|| \geq L.$$

2. (currently amended) A fiber optic gyroscope according to Claim 1, ~~further satisfying the following requirements~~ wherein:

$$|L1-L3| \geq L,\quad |L1-L5| \geq L$$

$$||L1-L3|-|L1-L5|| \geq L.$$

3. (currently amended) A fiber optic gyroscope according to Claim 1, ~~further satisfying the following requirements~~ wherein:

$$L2 \geq L,\quad L4 \geq L,$$

$$||L1-L2|-L3| \geq L$$

$$||L1-L4|-L5| \geq L$$

$$|||L1-L2|-L3|-||L1-L4|-L5|| \geq L.$$

4. (currently amended) A fiber optic gyroscope according to Claim 3~~, further satisfying the following requirements~~ wherein:

~~$L2 \geq L$,~~ $L2 \geq 2L$, $L3 \geq 4L$, ~~$L4 \geq 4L$,~~ $L4 \geq 8L$, $L5 \geq 16L$.

5. (currently amended) A fiber optic gyroscope ~~in which~~ comprising:

a light source;

a first polarization maintaining optical fiber;

a polarization maintaining optical fiber coupler;

a substrate-based optical integrated circuit;

a single mode fiber optic coil; and

a light receiver;

wherein a light beam from ~~a~~ the light source ~~is sequentially passed~~ passes through ~~a~~ the first polarization maintaining optical fiber and ~~a~~ the polarization maintaining optical fiber coupler to ~~be incident on a~~ the substrate-based optical integrated circuit ~~having the function to serve~~

wherein the optical integrated circuit serves as a polarizer and ~~having~~ a branching optical waveguide~~;~~ for branching the light beam into two beams ~~branched by the optical integrated circuit are made to be~~ that are incident on ~~the~~ opposite ends of ~~a~~ the single mode fiber optic coil;

wherein the two beams pass through the single mode fiber optic coil as a clockwise rotating beam and a counter-clockwise rotating beam~~; the clockwise rotating beam and the counter-clockwise rotating beam which have propagated thorough the fiber optic coil~~ and are coupled together in the optical ~~reintegrated~~ integrated circuit to produce an interference ~~therebetween~~ beam;

wherein the interference beam ~~is introduced from~~ passes through the optical fiber coupler into ~~a~~ the light receiver ~~to convert the light~~; and

wherein the light receiver converts intensity of the interference beam into an electrical signal~~; and the electrical signal is used to detect~~ for detecting an angular rate applied to the fiber optic coil about the axis thereof;

the fiber optic gyroscope further comprising:

a second and a third polarization maintaining optical fiber connected to ~~remaining two~~ end faces of the optical waveguide of the optical integrated circuit ~~at respective one end~~ where the polarization ~~axis~~ axes of the second and the third optical fiber ~~is~~ are coincident with the direction of the TE mode of the optical waveguide, the second and the third optical fiber having a respective length of L2 and L4;

and a fourth and a fifth polarization maintaining optical fiber ~~which are~~ having one end connected to ~~the other end of~~ the second and the third polarization maintaining optical fiber, respectively, ~~at their respective one end~~ where ~~the inherent~~ relative polarization axes of connected optical fibers are displaced by an angle of 45° ~~from each other~~, ~~the other ends of~~ the fourth and the fifth optical fiber ~~being~~ having another end connected to the opposite ends of the fiber optic coil, the fourth and the fifth optical fiber having a respective length of L3 and L5;

~~denoting a~~ wherein L denotes a length required to produce a group delay time difference between orthogonal polarizations in each polarization maintaining optical fiber which is in excess of the coherence length of a light beam from the light source ~~by L~~, the fiber lengths ~~satisfying~~ satisfy the following ~~requirements~~:

$$L3 \geq L,\quad L5 \geq L, \cancel{|L3\text{-}L5 \geq L}\ |L3\text{-}L5| \geq L.$$

6. (currently amended) A fiber optic gyroscope according to Claim 5, ~~further satisfying the following requirements~~ wherein;

$$|L2\text{-}L3| \geq L,\quad |L4\text{-}L5| \geq L$$

$$||L2\text{-}L3|\text{-}|L4\text{-}L5|| \geq L.$$